

4-2 AND 4-3

Classifying Triangles and
Angle Relationships in
Triangles

WARM UP

- 1) List everything you know about the angles of triangles.
- 2) List everything you know about the sides of triangles.
- 3) What are some ways to show that two triangles are congruent?

4-2 CLASSIFYING TRIANGLES

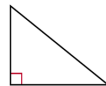
Triangles classified by angles:

Acute Triangle



Three acute angles

Right Triangle



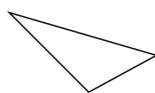
One right angle

Equiangular Triangle



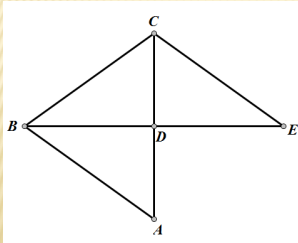
Three congruent acute angles

Obtuse Triangle



One obtuse angle

In the following illustration, identify triangles ABC, BCE, and BCD by their angle measures from the table above.



Triangle ABC:

Triangle BCE:

Triangle BCD:

4-2 CLASSIFYING TRIANGLES

Triangles classified by sides:

Equilateral Triangle



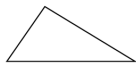
Three congruent sides

Isosceles Triangle



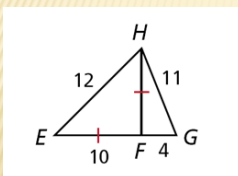
At least two congruent sides

Scalene Triangle



No congruent sides

In the following illustration, identify triangles ABC, BCE, and BCD by their side measures from the table above.



Triangle HGF:

Triangle HGE:

Triangle HEF:

4-2

- ✧ A manufacturer produces musical triangles by bending pieces of steel into the shape of an equilateral triangle. If each side of the triangle measures 4 inches, how many triangles can the manufacturer make from a 100 inch piece of steel?

4-3 ANGLE RELATIONSHIPS IN TRIANGLES**TRIANGLE ACTIVITY**

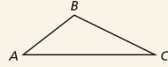
TRIANGLE ACTIVITY

- ✧ What were your observations about the three angles of your triangles being put together?
- ✧ What was similar?
- ✧ What was different?
- ✧ What can you conclude from this activity?

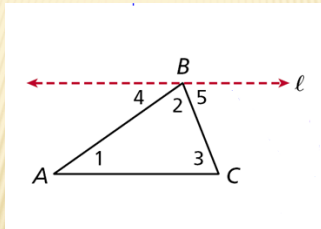
4-3

Theorem 4-2-1 Triangle Sum Theorem

The sum of the angle measures of a triangle is 180° .
 $m\angle A + m\angle B + m\angle C = 180^\circ$

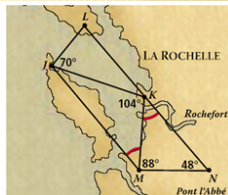


PROOF OF THE TRIANGLE SUM THEOREM





APPLICATION OF THE TRIANGLE SUM THEOREM

Use the diagram to find $m\angle MJK$.

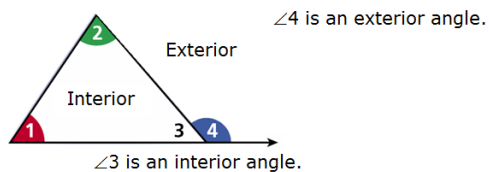


A **corollary** is a theorem whose proof follows directly from another theorem. Here are two corollaries to the Triangle Sum Theorem.

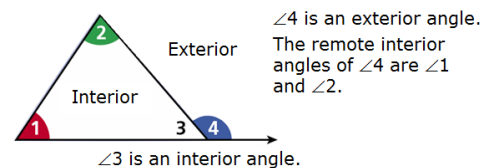
Corollaries

COROLLARY	HYPOTHESIS	CONCLUSION
4-2-2 The acute angles of a right triangle are complementary.		$\angle D$ and $\angle E$ are complementary. $m\angle D + m\angle E = 90^\circ$
4-2-3 The measure of each angle of an equilateral triangle is 60° .		$m\angle A = m\angle B = m\angle C = 60^\circ$

An **interior angle** is formed by two sides of a triangle. An **exterior angle** is formed by one side of the triangle and extension of an adjacent side.

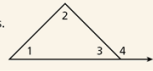


Each exterior angle has two remote interior angles. A **remote interior angle** is an interior angle that is not adjacent to the exterior angle.

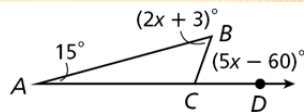


Theorem 4-2-4 Exterior Angle Theorem

The measure of an exterior angle of a triangle is equal to the sum of the measures of its remote interior angles.
 $m\angle 4 = m\angle 1 + m\angle 2$

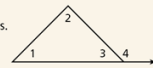


Find $m\angle B$.



Theorem 4-2-4 Exterior Angle Theorem

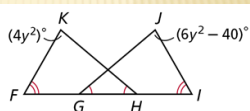
The measure of an exterior angle of a triangle is equal to the sum of the measures of its remote interior angles.
 $m\angle 4 = m\angle 1 + m\angle 2$



Theorem 4-2-5 Third Angles Theorem

THEOREM	HYPOTHESIS	CONCLUSION
If two angles of one triangle are congruent to two angles of another triangle, then the third pair of angles are congruent.		$\angle N \cong \angle T$

Find $m\angle K$ and $m\angle J$.



ASSIGNMENTS

- ✖ 4.2 Assignment: (pp 227-228)
12, 16, 18, 22, 24, 28.
- ✖ 4.3 Assignment (pp 236-237)
15, 16, 20, 22, 24, 29, 33, 38,
39.
